of the tail attain a length of six, seven, or even more feet. In these instances the growth must be continuous for many months to attain the unusual length.

In the so-called Silk fowl the feathers have the barbs entirely disconnected, so that the birds have a fluffy or woolly appearance; this in the ordinary white Silk fowl is conjoined with a singular development of black pigment, which is deposited in the skin, the periosteum, and the inter-muscular cellular tissue; but the silky feature may occur in other breeds, and is occasionally found in very different species, as, for example, in the Moorhen (*Gallinula chloropus*).

The plastic character of the species is evidenced by the fact that within a few years it has been the desire of poultry-fanciers to produce many of the varieties reduced to the size of Bantams. This has been most successfully accomplished with the Game, the Malay, the Cochin, and several others, specimens of which were exhibited at the show.

XXVIII.—*On the Habits of the Hoatzin* (Opisthocomus cristatus). By J. J. Quelch, B.Sc. (Lond.), C.M.Z.S., Curator of the British Guiana Museum.

The observations on which the following notes are based were made in March, May, and October 1888, July 1889, and January 1890; and as they extended over but short periods at each time, no doubt several characteristics have remained unnoted which more continuous attention would have revealed.

The Hoatzin is known in British Guiana by the various names of "Anna," "Hanna," "Canjé, or Stinking Pheasant," and "Governor Battenberg's Turkeys;" but in the districts where it is found the name of "Hanna" is the one most commonly used. These birds are plentifully distributed along the Berbice river above the town of New Amsterdam, along the Canjé creek, which opens into the Berbice immediately below the same town, and along the Abary creek, one of the higher branches of which leads into the Berbice river, and along which the birds have most likely spread, by this channel, from the main stream. They are said to extend upward along the Berbice and the Canjé for a considerable distance; but on this point I have no personal knowledge, and reports which I have heard on the subject are conflicting.

Where the birds are most abundantly found, the banks of the watercourses are lined by a thick, often impenetrable, and variable growth, which is washed and partially swamped by the water at high tide, and is fronted with a wide and deep deposit of soft mud at low water. Among the plants, a prickly and thorny, low-spreading, much-branched, leguminous shrub or tree, commonly known as the "Bundoorie pimpler" (*Drepanocarpus lunatus*), which stretches out even over the water, rising and falling with it, generally occurs in more or less dense masses, together with the "Courida" (*Avicennia nitida*), and a tall tree-like aroid, commonly known as "Mucco-mucco" (*Montrichardia arborescens*), which grows most luxuriantly in the muddy and swampy districts; and the young leaves and the fruits of these plants furnish almost the entire food of these birds. I have never seen them on the ground, nor feeding on the low weedy growths on its surface.

Almost invariably, where one or other of the three mentioned plants formed the nearly continuous growth by the water, the birds there shot contained in their crops only the leaves (or fruit) of that one plant; but where the plants were mingled, sometimes one and sometimes another had been eaten.

This dense lining-growth furnishes the home of the birds. In the early morning or the late afternoon they will be seen sitting in numbers on the plants, while towards the middle of the day, as the fierce heat of the sun increases, they betake themselves to shelter, either in the denser recesses of the growths, or among the individual trees of denser foliage, or among the tangled masses of creeping and climbing vines, which frequently spread over considerable areas of their food-plants along the very edge of the water. At this time one may pass, by boat, along the river without the faintest idea of the proximity of the birds, unless a very sharp watch be kept up among the more leafy growths, or unless the report of a gun causes them to utter their curious cry. Late in the evening, after feeding, they will be seen settling themselves down in suitable places for the night.

The cry of the Hoatzin is easily heard when they are disturbed, and it is one of which it is not easy to give an exact idea. It recalls slightly the shrill screech of the Guinea-bird (*Numida*), but is made up of disjointed utterances, like the notes "heigh" or "sheigh" (*ei* as in "sleigh"), pronounced with a peculiarly sharp and shrill nasal intonation, so as to be quite hiss-like. While they are treading, the noise made is considerable, the cry being more continuous and shriek-like.

Whether from the fact of their occupying situations where they are but seldom disturbed or but little likely of being pursued, or from a natural weakness of wing, the birds are but seldom seen in flight; and when they take to the wing during disturbance, they do so but for very short distances—a very exceptional flight being once observed of a length of about forty yards with the wind, across a creek, from a high growth on one bank to a lower level on the other. Usually they rise almost with a jump from the branch, seldom in a straight line, but with a marked convex curve to the point where they alight. The flight of the birds, in spite of their great expanse of wings in relation to the weight of the body, is thus extremely awkward, and the body presents a peculiarly humped appearance. During their longer courses the wings are rapidly and violently flapped.

When suddenly disturbed, as by the discharge of a gun amongst a group of them, they fly or spring away for distances of but a few feet, while those in the immediate vicinity show no other signs of alarm but the loud utterance of their shrill cry. While springing from place to place, when they are feeding or alarmed, they keep their wings fully expanded, and inclined almost vertically when they have first alighted, thus balancing themselves, the crest being then erect and the tail raised and expanded. It is at such times especially that their plumage presents a really beautiful aspect, in spite of their sober colouring.

The apparent awkwardness in placing themselves when they alight is chiefly due, I believe, to the smallness of the branches on which they usually settle, and which they are unable firmly to grasp with their long toes, balancing themselves meanwhile by the expanded wings and tail; but it is also attributable, I think, though to a much less degree, to a certain weakness in their legs—even though these are thick and apparently strong-looking—since when they alight on a thick limb a certain amount of instability is still manifest.

This weakness of limbs seems to be still more evidenced by the method of perching characteristic of the birds. At any time during the heat of the day they will be found resting on the branches, two or more together, the body directly applied to the wood, and supported on the bare, thickened, and hardened patch of skin which covers the flattened and broadened surface of the posterior termination of the *carina sterni*. This surface of the keel affords a firm base of support, and as the axis of the sternal keel is not parallel with, but markedly inclined to, the spine, a slight tilt of the spine from the horizontal brings the axis of the sternum close to the vertical, and allows nearly the full weight of the bird to be thrown on the sternal base, while the body of the bird seems to be quite horizontal, owing to the fact that the enormous looped crop, which is directly and closely applied to the face of the furculum and sternum, causes a bulging of the body in the front to balance the extension of the rump behind. The feet of the bird while grasping the branch here evidently support but a very small part of the weight of the body, and are more concerned with its equipoise and stability.

To judge from the conditions under which the birds at present here exist, it would seem that the sluggish habit has been brought about by a weakening of special muscles through disuse. From the nature of their food no prolonged flight is needed in order to procure it; from the nature of their habitat they are little liable to be interfered with or pursued, and, if troubled, they can easily take refuge without prolonged flights. Even by man they are seldom meddled with, except for scientific purposes, since a peculiar and unpleasant odour attaches to the flesh, especially after death, and which seems to be due to the penetration of the fluid and gaseous contents of the digestive tract. On this account they are not generally eaten; but a few cases have been reported to me in which they have been utilized for food.

The nesting-time of the birds certainly extends from December to July, and I think it very likely that it is continuous throughout the year. From information given to me in 1887, I was led to conclude that March and April were their nesting-months; but as the result of my own observation, chicks are to be found quite early in January, and freshly-laid eggs in the early part of July, as well as the intervening months.

The nests, which are made solely of a slightly concave mass of dried twigs and sticks taken from the plants on which they are built, and loosely laid on top and across each other, are placed in conspicuous positions high up over the water or soft mud, on the top of or amongst the bushy growth, where they are fully exposed to the direct sunshine. Almost invariably the plants thus built on were the close-growing "Bundoorie pimpler," though in a few cases I have seen them on the courida, and on a "pimpler (or prickly) palm" (*Bactris major*).

In October 1888, along the Abary creek, when nearly for a fortnight the birds were under observation at frequent intervals, no nests nor young birds were noticed, but as the Bundoorie pimpler was almost entirely absent, and the lining growth along the water-side consisted of mucco-mucco and other plants, on the top of which it was impossible for the birds to perch, and much more so to make nests, it may well be that they were even then nesting, but in such positions as to be screened from observation. Believing at that time that the birds only nested from March to May, I made no special attempts to search for nests; nor have I yet had an opportunity of seeing whether, along the Berbice river and the Canjé creek, nests are to be found on the Bundoorie pimpler at that time of the year.

From the binding nature of the spiny twigs, the nests last for a considerable time, and these are certainly made use of again, possibly after more or less repair. The same nest has been found in use after an interval of seven months.

Two or three eggs are laid at a time, both numbers being about equally common in my experience; and in one special case six eggs were taken from a nest on which one bird had been sitting, but whether they had been laid by one bird or two birds there was nothing to show. The eggs, which vary considerably in size, being usually as large as a small-sized hen's egg, though often a good deal larger or smaller, are easily seen from beneath the nest, owing to its loose structure, and the whitish eggs, with scattered dark reddish-brown blotches, more closely placed at the obtuse pole, form a marked contrast with the greyish-brown twigs of the nest. Even while the birds are sitting on them the eggs must be kept fairly cool from below; and this evidently gives the explanation why a number of freshly laid eggs that were placed to be hatched out by a common fowl exploded one after another, much to the alarm of the foster parent, who, however, stuck to the nest with the remainder after each occurrence.

Soon after the hatching of the eggs, the nestlings begin to crawl about by means of their wings and legs, the well-developed claws on the pollex and index being constantly in use for holding and hooking on to the surrounding objects. If they are drawn from the nest by means of their legs, they hold on firmly to the twigs both with their bill and wings; and if the nest be upset by means of a rod pushed up from below, they hold on to all objects with which they come in contact by means of bill, feet, and wings, making considerable use of the bill, not only to reach objects above them, but also, with the help of the clawed wings, to raise themselves to a higher level. When the parent bird is driven from the nest, owing to the close approach of a boat, generally through an opening cut in the floating Bundoorie pimpler, at high water, or to the cutting and pulling of the branches by some one who has waded through the soft mud, often up to the thighs, at low water, then the young birds, unless they be only quite recently hatched, crawl out of the nests on all fours, and rapidly try to hide in the thicker bush behind.

One curious feature noticed with a nestling which had been upset into the river was its power of rapid swimming and diving when pursued. As soon as the hand was placed close to it, it rapidly dived into the dark water, in which it was impossible to see it, and would rise at distances of more than a yard away. Owing to this power the little creature managed to evade all my attempts to seize it, taking refuge eventually far under the bushy growth, where it was impossible to pursue it. The prolonged immersion which a nestling will thus instinctively and voluntarily undergo, or which an adult bird will bear in an attempt to drown it, seems to me to be quite remarkable.

The nestlings, when resting on the bare sticks of the nest, are observed to rest the weight of the body, as in the adult birds, on the bare and thickened integument of the *carina sterni,* the toes being spread out and the wings generally drawn up to the sides.

I am unable to state from observation the method of feeding of the nestlings. In very young specimens when the crops were examined the food was found to consist of a central portion of closely packed pieces of young and thin leaves, apparently both of the courida and the Bundoorie pimpler, surrounded by a finer more pulpy mass, which was thus in contact with the walls of the organ, and which had evidently, from its position, been more acted upon than the central portion. The enclosed pieces of leaves were sometimes nearly three quarters of an inch in length, quite ragged in outline and much folded, so much so as to give the impression of a finely comminuted mass until they were carefully unrolled. In nestlings of much larger size the food-mass of the crop was considerably more comminuted, but it still contained distinctly recognizable portions of leaves, and often these were from half to three quarters of an inch in length.

From the nature of the food contents, I was led to believe that the time of day at which the young birds were procured made a considerable difference as to the state of the food in the crop. The feeding-time of the adult birds is evidently the early and late parts of the day, at which time their crops are found to contain, and especially at their anterior part, quantities of large pieces of young leaves, and sometimes these pieces consist of a half or nearly an entire leaf, almost unaltered—the pieces packed against and between the wrinkled surface of the immensely developed *rugæ* being, however, seldom of this nature. Early in the morning and late in the afternoon, before feeding-time, the contents of the crop are but little recognizable, the fragments being considerably altered, as well doubtless by the peculiar warmth and moisture as by the special action of its strong *rugæ*. If the nestlings are fed by the parent birds with small portions of the young foliage, which, owing to its softness and delicacy, the weakest condition of their jaws would allow them to tear from the bills of their parents, either in large or small portions, the long resting-time during the night and the middle of the day would be sufficient to cause a change in the leaf-pieces corresponding to that produced in the adult birds.

The nestlings, even when quite small, are frequently found, far away from any nest, climbing, by the help of their clawed wings, after the parent birds during their feeding-time; and it seems a most likely thing, though I have never directly observed it, that they are then fed with the tender leaves which the parents pluck for them. Failing the proof from direct observation, there seems to be no necessity for concluding that the nestlings are fed by a regurgitation of the food-mass from the crop of the adult birds, as Dr. Young has been inclined to think likely ('Notes from the Leyden Museum,' vol. x. p. 171).

It was a very noticeable thing, during the various months when the birds were under my observation, that a very large proportion of those that were shot were by no means in good plumage, a variable number of the quills of the wings and tail, and sometimes the feathers of the crest, and frequently those of the neck and breast, being only in process of growth. So marked was this feature in October 1888, along the Abary creek, that I was inclined to regard that season as a moulting-period ('Timehri,' vol. ii., new series, 1888, p. 364); since then, however, I have found them in very much the same condition in July 1889 and January 1890.

This is all that I am at present able to furnish about the habits and breeding of these birds; but I trust soon to be able to offer some additional notes on a few points that have remained untouched owing to the want of definite information.

XXIX.—*On the Range of the Guácharo* (Steatornis caripensis) *in South America.* By P. L. Sclater, M.A., Ph.D., F.R.S.

The range of the very peculiar and isolated bird-type, *Steatornis,* in South America is much wider than is usually represented. Some time ago I made some investigations on this point which I only partly published (see P. Z. S. 1866, p. 130). It may save future writers some trouble if I give a few further remarks on the subject, principally taken from my former notes.

The Guácharo was originally discovered by Humboldt and Bonpland in 1799 in the cavern of Caripé, in the province of Cumaná, Venezuela*. L'Herminier, in 1834, obtained specimens from the same locality, and published an excellent article† on the bird. Because L'Herminier lived in Guadeloupe, Gray, in his 'Genera of Birds' (i. p. 44), gave that island also as one of the localities of the Guácharo. But this was a great error.

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* See Humboldt, 'Journ. de Physique,' liii. p. 57 (1801).

† N. Ann. d. Mus. iii. p. 321 (1834); id. Compt. Rend. iii. p. 67 (1836); id. Ann. Sc. Nat. sér. 2, vi. p. 60.